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COLLAPSIBLE STRUCTURES

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BACKGROUND OF THE INVENTION

1. Related Cases

This is a continuation-in-part of co-pending Serial No. 10/665,194, filed September 17, 2003, entitled "Collapsible Structures", which is in turn a continuation-in-part of Serial No. 10/346,832, filed January 17, 2003, entitled "Collapsible Structures", whose entire disclosures are incorporated by this reference as though set forth fully herein.

2. Field of the Invention

The present invention relates to collapsible structures, and in particular, to collapsible structures which are adapted to hold and contain water, and which may be twisted and folded to reduce the overall size of the assembly to facilitate convenient storage and use.

3. Description of the Prior Art

Collapsible objects have recently become popular with both adults and children. Examples of such collapsible objects are shown and described in U.S. Patent Nos. 5,038,812 (Norman), 5,467,794 (Zheng) and 6,390,111 (Zheng) in the form of collapsible structures. These structures can be used as play structures, shelters, tents, and storage structures, among other uses. These structures may be twisted and folded to reduce the overall size of the structures to facilitate convenient storage and use. As such, these structures are being enjoyed by many people in many different applications.

Other examples of collapsible objects include blanket, mat and floating assemblies as illustrated in one or more of U.S. Patent Nos. 6,073,283 (Zheng), 6,170,100 (Le Gette et al.), 6,343,391 (Le Gette et al.) and 6,485,344 (Arias). These assemblies can be used as blankets, floor mats, and floating loungers. These blankets, mats and loungers may be twisted and folded to reduce the overall size of the blanket or mat to facilitate convenient storage and use.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a collapsible structure that can hold and contain matter without leakage of the contained matter.

It is another object the present invention to provide a collapsible and waterproof structure that can hold and contain water without leakage thereof.

The objectives of the present invention can be accomplished by providing, in one embodiment, a collapsible structure having at least three foldable frame members, each having a folded and an unfolded orientation, and a waterproof sheet material covering each frame member to form a panel for each frame member. The panels are coupled to each other to form a ring of panels that defines an interior space, and the structure also includes a waterproof bottom panel attached to the bottom of each panel in a manner such that the interior space is waterproof.

According to another embodiment of the present invention, a collapsible structure has a foldable frame member having a folded and an unfolded orientation, a waterproof sheet material covering the frame member to form a bottom panel, and a waterproof enclosing wall that defines an interior space, the enclosing wall having a bottom edge that is attached to the periphery of the bottom panel in a manner such that the interior space is waterproof.

According to yet another embodiment of the present invention, a collapsible structure has first and second flexible frame members, each frame member defining a closed loop and having a first side and an opposing second side, each frame member adapted to assume an expanded position and a collapsed position, with the two frame members overlapping each other at a first overlapping point along the first sides of the frame members, and at a second overlapping point along the second sides of the frame members. The frame members are adapted to assume a deployed position in which one frame member is disposed at an angle with respect to the other frame member at the overlapping points, so that the structure defines a top side and a bottom side when the frame members are in the deployed position. The structure also includes a waterproof enclosing wall extending about the two frame members and the bottom side to define a waterproof interior space.

According to yet a further embodiment of the present invention, a structure has an annular rim member defining a central opening, with the rim member including a frame member. The structure also has a flexible and waterproof material attached to the rim member to form a containing member that defines a containing space

therewithin, the containing member having a base that has a diameter that is greater than the diameter of the rim member when the containing space is filled with a liquid.

According to yet a further embodiment of the present invention, a structure has annular rim member defining a central opening, the rim member including a first frame member. A flexible and waterproof material is attached to the rim member to form a containing member that defines a side wall with a containing space therewithin. At least one other frame member is attached to the side wall of the containing member and spaced apart from the first frame member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a perspective view of a collapsible structure according to one embodiment of the present invention.

FIG. 1B is a partial cut-away view of the section B of the structure of FIG. 1A illustrating a frame member retained within a sleeve.

FIG. 2A is a cross-sectional view of a first preferred connection between two adjacent panels of the structure of FIG. 1 taken along line 2--2 thereof.

FIG. 2B is a cross-sectional view of a second preferred connection between two adjacent panels of the structure of FIG. 1 taken along line 2--2 thereof.

FIGS. 3A through 3C illustrate how the collapsible structure of FIG. 1A may be twisted and folded for compact storage.

FIGS. 4-7 are perspective views of collapsible structures according to other embodiments of the present invention.

FIG. 8A is a cross-sectional view of one embodiment of the rim member of the structure of FIG. 7 taken along line 8--8 thereof.

FIG. 8B is a cross-sectional view of another embodiment of the rim member of the structure of FIG. 7 taken along line 8--8 thereof.

FIG. 9 is a perspective view of a collapsible structure according to yet another embodiment of the present invention.

FIG. 10 is a cross-sectional view of the structure of FIG. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating general principles of embodiments

of the invention. The scope of the invention is best defined by the appended claims.

The present invention provides collapsible structures that have an enclosed interior space that can be used to hold and contain water or other viscuous and non-viscuous matter. The interior space is defined by an enclosing wall and a base that are both waterproof to prevent leakage of the water or matter contained in the interior space. None, one or more foldable frame members can be provided as part of the enclosing wall and the base. The frame members allow the resulting structure to be twisted and folded to reduce the overall size of the structure.

FIG. 1A illustrates a collapsible structure 20 that is made up of a plurality of panels that are hingedly coupled together. The structure 20 has four side panels 22, 24, 26 and 28 hingedly connected to each other to form a ring of panels that encircle an enclosed space. Each panel 22, 24, 26, 28 has four sides, a left side 30, a bottom side 32, a right side 34 and a top side 36. The left side 30 of each panel 22, 24, 26, 28 is hingedly coupled to the right side 32 of an adjacent panel 22, 24, 26, 28 to encircle the enclosed space.

Even though each panel 22, 24, 26, 28 is illustrated as having four sides, it is possible to configure any of these panels 22, 24, 26, 28 with any shape having different number of sides, including sides that have varying degrees of curvature. For purposes of the present invention, a "side" can have varying degrees of curvature and is not restricted to merely a straight configuration. As a result, each side 30, 32, 34 can be partially or completely curved.

Referring to FIG. 1B, each panel 22, 24, 26, 28 has a continuous frame retaining sleeve 38 provided along and traversing the edges of its sides 30, 32, 34, 36. A continuous frame member 40 is retained or held within each frame retaining sleeve 38 to support each panel 22, 24, 26 and 28. Only the frame member 40 for panel 24 is shown in FIG. 1B; the other frame members 40 for the other panels 22, 26, 28 are not shown but are the same as frame member 40 in FIG. 1B. The continuous frame members 40 may be provided as one continuous loop, or may comprise a strip of material connected at both ends to form a continuous loop. The continuous frame members 40 are preferably formed of flexible coilable steel, although other materials such as plastics may also be used. The frame members 40 should be made of a material which is relatively strong and yet is flexible to a sufficient degree to allow it to be coiled. The material should have a memory that allows the frame members to spring back to the expanded position when unfolded

from the folded position. Thus, each frame member 40 is capable of assuming two positions or orientations, an open or expanded position such as shown in FIG. 1A, or a folded position in which the frame member is collapsed into a size which is much smaller than its open position as shown in FIG. 3C.

In addition, a protective covering 42 can be provided to cover the frame member 40. The protective covering 42 can be the same as that which is described in U.S. Patent No. 5,845,697 to Zheng, whose entire disclosure is incorporated by this reference as though set forth fully herein. The protective covering 42 can be effective in preventing the metallic frame member 40 from rust and damage due to possible exposure to water.

Sheet material 46 extends across each panel 22, 24, 26 and 28, and is held taut by the respective frame members 40 when in the open position. The term sheet material is to be given its broadest meaning and should be made from strong, lightweight materials and may include waterproof materials such as films, soft plastic, PVC, and nylons, and non-waterproof materials such as fabric material (e.g., mesh, woven fabrics, etc.), depending on the application for which the structure 20 is used. The sheet material should be flexible, and also durable to withstand the wear and tear associated with rough treatment by children or outdoor use. The frame members 40 may be merely retained within the respective frame retaining sleeves 38 without being connected thereto. Alternatively, the frame retaining sleeves 38 may be mechanically fastened, stitched, fused, or glued to the frame members 40 respectively, to retain them in position.

FIG. 2A illustrates one possible connection for connecting adjacent sides 30 and 34 of two panels 24 and 22, respectively, of FIG. 1A. The sheet material 46 for the two panels 22, 24 are stitched at their edges by a stitching 48 to the respective sleeves 38. Each sleeve 38 may be formed by folding a piece of sheet material or fabric. The stitching 48 also acts as a hinge for the panels 22 and 24 to be folded upon each other, as explained below. The connections for the three other pairs of adjacent edges may be identical. Thus, the connections on the left side 30 and the right side 34 of each panel 22, 24, 26 and 28 act as hinge connections for connecting an adjacent panel.

FIG. 2B illustrates a second possible connection for connecting adjacent sides 30 and 34 of two panels 24 and 22, respectively, of FIG. 1A. The fabric or sheet material 46 can be folded over at their edges at the bottom side 32 and the top side

36 to define the respective sleeves 38. However, the frame retaining sleeves 38 converge at, or are connected to, one sleeve portion which interconnects panels 22 and 24 to form a singular frame retaining sleeve 50 which retains the two frame members 40. Sleeve 50 of FIG. 2B may be formed by providing a tubular fabric or sheet material, or by folding a piece of fabric or sheet material, and applying a stitching 52 to its edges to connect the sleeve 50 to the fabric pieces 46 of the panels 22, 24. Stitching 52 acts as a hinge for the panels 22 and 24. The connections for the three other pairs of adjacent edges may be identical.

A bottom piece or floor 58 can be attached (e.g., by stitching, fusing, etc.) to the bottom sides 32 of the panels 22, 24, 26, 28. The bottom piece 58 can be made from the same flexible material as the sheet material 46.

In addition, an upper border 60 can be connected to the top sides 36 of the panels 22, 24, 26, 28 to provide a soft bordering edge that the user can rest on. The upper border 60 can assume any configuration (circular, square, rectangular, etc.) and defines an opening. In one embodiment, the upper border 60 can be a sleeve that houses a collapsible frame member which has the same construction as frame member 44. According to another embodiment, the upper border 60 can be an inflatable tube made from soft material.

While the structure 20 of FIG. 1A is shown and described as having four panels, each having four sides, it will be appreciated that a structure may be made of any number of panels, each having any number of sides, without departing from the spirit and scope of the present invention. Thus, the structure 20 of the present invention may take a variety of external shapes. However, each panel of the structure 20, regardless of its shape, is supported by at least one continuous frame member 40.

FIGS. 1A and 3A through 3C illustrate how the structure 20 of FIG. 1A can be twisted and folded to reduce the structure 20 into a collapsed configuration having a reduced size. The same principles can be applied to collapse all the other embodiments of the present invention. Referring to FIG. 1A, the first step consists of pushing in panels 22 and 24 such that panel 22 collapses upon panel 28, and panel 24 collapses upon panel 26. Then, in the second step, the two panels 24 and 26 are folded so as to be collapsed upon the two panels 22 and 28. The resulting structure 20 is now a stack of four panels 28, 22, 24, 26 (in one possible order) as shown in FIG. 3A, which is then twisted and folded to collapse the frame members and panels

into a smaller shape. In the next step shown in FIG. 3A, the opposite border (designated by the numeral 62) of the structure 20 is folded in upon the previous fold to further collapse the frame members with the panels. As shown in FIG. 3B, the next step is to continue the collapsing so that the initial size of the structure 20 is reduced. FIG. 3C shows the frame members and panels collapsed on each other to provide for a small essentially compact configuration having a plurality of concentric frame members and layers of the panels so that the collapsed structure 20 has a size which is a fraction of the size of the initial structure 20. During the twisting and folding steps, the floor 58 can be tucked between any two adjacent panels, or on top of the stack of panels, to be twisted and folded together with the panels.

To re-open the structure 20 to its expanded configuration, the combined stack of panels is unfolded. The memory (i.e., spring-load) of the frame members 40 will cause the frame members to uncoil on their own and to quickly expand the panels to their expanded configuration shown in FIG. 1A. The same principle can be applied to re-open all the other embodiments of the present invention.

The structure 20 can be used as a wading pool, swimming pool, spa pool, or other pool or water tank that can hold water and, optionally, at least one occupant. When used for these purposes, the sheet materials 46 and 58 are preferably made of any of the waterproof materials described above. The height of the left side 30 and the right side 34 of the panels 22, 24, 26, 28 can be varied depending on the intended use. For example, the height of the sides 30, 34 can be greater when the structure 20 is used as a spa pool or swimming pool, and can be smaller when the structure 20 is used as a wading or play pool for children. The same principles are applicable to all the other embodiments illustrated herein.

The structure 20 can also be used as a pot or container or holding trees and plants. When used for these purposes, the sheet materials 46 and 58 can be made of a waterproof material, or a fabric material that allows water to seep therethrough for irrigation purposes.

Any number of different shade structures can be used with the structure 20 to shade the interior of the structure 20. FIG. 1A illustrates one embodiment of a shade structure 70 which can be provided for use with the structure 20. The shade structure 70 can be provided in the form of at least one panel 72 that has been arched or bent. The panel 72 can have the same construction as the panel 24 described herein, except that the sheet material 74 on the panel 72 can be provided

in the form of fabric, nylon, mesh, or any similar material. The panel 72 has one frame member that defines two opposing side edges 76, 78, with each side edge 76, 78 being attached (e.g., by Velcro™ straps, hooks, ties or the like) to the top side 36 of one of two opposing panels 22 and 26, or 24 and 28. The panel 72 can function to shade the interior of the structure 20. For example, if the structure 20 is being used as a pool, the panel 72 can shade the occupants (especially children) of the pool from harmful sunlight.

The shade structure used with the structure 20 can also be embodied in many different configurations. For example, the collapsible structures illustrated in FIGS. 1, 5A, 6 and 7 of U.S. Patent No. 6,289,910 to Zheng, FIGS. 1, 4, 5, 6, 7 and 8 of U.S. Patent No. 6,360,761 to Zheng, FIGS. 1 and 12 of U.S. Patent No. 5,301,705 to Zheng, FIGS. 11A, 14A and 20 of U.S. Patent No. 6,138,701 to Zheng, FIGS. 27 and 28 of U.S. Patent No. 6,449,147 to Zheng, FIGS. 1 and 5-10 of U.S. Patent No. 6,453,923 to Zheng, FIGS. 1, 6 and 7 of U.S. Patent No. 5,778,915 to Zheng, FIGS. 4A and 5A of U.S. Patent No. 6,092,544 to Zheng, FIGS. 1A, 2A, 2B, 3A, 5A, 6A, 7A, 8A, 9, 10A, 11A, 12, 13, 14A, 15 and 16 of U.S. Patent No. 6,098,349 to Zheng, FIG. 1A of U.S. Patent No. 5,560,385 to Zheng, and FIGS. 4, 5, 7, 8, 9, 10-17, 23 and 24 of U.S. Patent No. 6,082,386 to Zheng can all be permanently or removably attached to the structure 20, and the disclosures in each of these patents are hereby incorporated by this reference as though set forth fully herein.

FIG. 4 illustrates a structure 90 that can also be used as a pool or container for holding water. The structure 90 has a base panel 92 that can have the same construction as the panel 24 described above, and having a frame member (not shown, but can be the same as 40) and sheet material 94 that is made of a waterproof and flexible material. The panel 92 can have any desired shape (e.g., circular, square, rectangular, etc.) and size. A vertical enclosing wall 96 is attached to the periphery of the base panel 92 and defines an interior space 98. The wall 96 can be made from a waterproof and flexible material. As an alternative, the wall 96 can be inflatable and made from a conventional two-layered material having an inflation chamber through which an inflation media (e.g., air or water) can be introduced to inflate the wall 96. A plurality of inflatable tubes 100 can be attached to the wall 96 and positioned in spaced-apart manner from each other. The tubes 100 can be made of a soft and flexible material. When the tubes 100 are inflated, they provide the necessary support to hold the wall 96 upright in the configuration shown

in FIG. 4. If the wall 96 is itself inflatable, the tubes 100 can be omitted. In addition, an upper border 102 is provided along the top edge of the wall 96, and can be the same as the upper border 60, and embodied as a sleeve with a collapsible frame member, or as an inflatable tube.

To store the structure 90, the user can deflate the wall 96 (if the wall 96 is inflatable) and the tubes 100, and then the wall 96 and the tubes 100 can be compressed against the panel 92. The panel 92 can then be twisted and folded according to the steps shown in FIGS. 3A-3C to collapse the structure 90 into a smaller size for convenient storage.

The structure 90 in FIG. 4 can be modified by providing a collapsible frame member (such as frame member 40) as part of the upper border 102, and providing the panel 92 with merely the sheet material 94 and without any frame member. In such an embodiment, the user can deflate the wall 96 (if the wall 96 is inflatable) and the tubes 100, and then the sheet material 94, the wall 96 and the tubes 100 can be compressed against the upper border 102 and its frame member. The frame member in the upper border 102 can then be twisted and folded according to the steps shown in FIGS. 3A-3C to collapse the structure into a smaller size for convenient storage.

FIG. 5 illustrates a structure 20a having a similar configuration as the structure 20 in FIG. 1A. The structure 20a can also be used as a pool or container for holding water. As a result, the same numerals are used to designate the same elements in FIGS. 1A and 5, except that an "a" is added to the numerals in FIG. 5. In FIG. 5, the panels 22a, 24a, 26a, 28a are the same as the panels 22, 24, 26, 28, respectively, in FIG. 1A, except that connecting sheet material 110 is attached between the left side 30a of each panel and the right side 34a of each adjacent panel. The connecting sheet material 110 can function like the enclosing wall 96 in FIG. 4, and can be embodied in the form of a single sheet of material or can have two layers to define an inflatable chamber therewithin. In structure 20a, the connecting sheet material 110 functions as a hinge. In addition, the upper border 60a can be the same as the upper border 60, and embodied as a sleeve with a collapsible frame member, or as an inflatable tube.

The structure 20a can be collapsed in the same manner as the structure 20 using the steps illustrated above in connection with FIGS. 1A and 3A-3C. In particular, the first step consists of pushing in panels 22a and 24a about the hinges

defined by the sheet material 110 such that panel 22a collapses upon panel 28a, and panel 24a collapses upon panel 26a. Then, in the second step, the two panels 24a and 26a are folded so as to be collapsed upon the two panels 22a and 28a. The resulting structure 20 is now a stack of four panels 28, 22, 24, 26 (in one possible order), which is then twisted and folded to collapse the frame members and panels into a smaller shape according to the principles illustrated in FIGS. 3A-3C. Each of the sheet material 110 can be tucked between two panels, and twisted and folded together with the panels.

FIG. 6 illustrates another collapsible structure 120 according to the present invention that can also be used as a pool or container for holding water. The structure 120 has two overlapping or crossing collapsible frame members 122 and 124 that together define the outer boundaries of the walls of the structure 120. Referring to FIG. 6, each frame member 122 and 124 is provided as a closed resilient loop, either as a closed continuous loop or as a strip of material with both ends held together by a retaining connector or other conventional attachment mechanism to form a closed loop. Each frame member 122 and 124 is preferably formed of flexible coilable steel having a memory, and can be the same as the frame member 40 described above. Each frame member 122 and 124 can be substantially equal in size and symmetrically disposed, but it will be appreciated by those skilled in the art that the frame members 122 and 124 may assume any variety of shapes and sizes, including but not limited to circular, polygonal or oval. Both frame members 122 and 124 can even be provided in different sizes.

As illustrated in FIG. 6, the two frame members 122 and 124 overlap or cross-over each other at overlapping points 126 and 128. In one non-limiting embodiment, the left side of the first frame member 122 is interior to the left side of the second frame member 124, and the right side of the first frame member 122 is interior to the right side of the second frame member 124, so that the first frame member 122 is completely contained within the second frame member 124. The overlapping point 128 is defined by the intersection or crossing of the left sides of frame members 122 and 124, respectively, and the overlapping point 126 is defined by the intersection or crossing of the right sides of frame members 122 and 124, respectively. The overlapping points 126 and 128 can be positioned anywhere along the left and right sides of the frame members 122, 124, although they are shown as being positioned at about the center of the left and right sides in the structure 120 in FIG. 6. The two

overlapping frame members 122 and 124 are pivotable about their overlapping points 126 and 128 between two positions, a first open position (see FIG. 6) in which both frame members 122 and 124 are disposed at an angle with respect to each other, and a second folded position in which the frame members 122 and 124 are folded towards each other (such as in the direction of arrows 138 and 140 in FIG. 6) to overlie each other in generally the same plane. When in the first open position, the bottom sides 142 and 144 of the frame members 122 and 124, respectively, are adapted to rest on a surface to form a supporting base for the structure 120. In contrast, when in the second folded position, the bottom sides 142 and 144 (and the top sides 143 and 145) of the frame members 122 and 124, respectively, are urged against each other.

The frame members 122 and 124 are not connected or attached at the overlapping points 26 and 28 so as to allow the frame members 122 and 124 to pivot about these points in the two directions illustrated by arrows 138+140 and 146+148 in FIG. 6, with the overlapping points 126 and 128 together acting as hinges when the frame members 122 and 124 are simultaneously pivoted about these points 126 and 128.

Each frame member 122 and 124 is retained in a separate frame retaining sleeve that extends around the entire frame member. Each frame retaining sleeve is stitched to a wall 152, which is described in greater detail hereinbelow. The construction of each sleeve, and how each sleeve is attached to the wall 152, are disclosed in greater detail in U.S. Patent No. 6,092,544 to Zheng, whose disclosure is incorporated by this reference as though set forth fully herein. The frame members 122, 124 may be merely retained within the respective retaining sleeves without being connected thereto. Alternatively, the retaining sleeves may be mechanically fastened, stitched, fused, or glued to the respective frame members 122, 124 to retain them in position.

The structure 120 has an enclosing wall 152 and a bottom wall 154 that are supported by the frame members 122, 124 when the structure 120 is in the open position, to form an enclosed space for holding water or other matter. The walls 152, 154 can be made from a material similar to the sheet material 46 described above. An upper border 156 can be provided at the top of the structure 120 and attached to the top sides 143 and 145 of the frame members 122, 124, respectively. The border 156 can have the same construction as the border 60 described above. The border

156 defines at least one opening through which water or other matter can be introduced into the interior of the structure 120.

In one embodiment, the enclosing wall 152 can be generally circular or oval. Alternatively, the sleeves and their frame members 122, 124 can be attached (e.g., by stitching), to the surface of the wall 152 in a manner such that they define four separate vertical side walls for the enclosing wall 152, as disclosed in U.S. Patent No. 6,092,544 to Zheng.

When the structure 120 is in its fully deployed configuration shown in FIG. 6, the enclosing wall 152 defines the limits to which the two frame members 122, 124 can be pivoted away from each other (i.e., pivoted in directions of arrows 146, 148).

The structure 120 can be folded and collapsed in the following manner. The first step consists of urging the two frame members 122 and 124 towards each other (as shown by arrows 138 and 140 in FIG. 6) about the hinging mechanism of the overlapping points 126, 128. The enclosing wall 152 collapses onto the frame members 122 and 124 as the frame members 122, 124 are urged against each other. When the two frame members 122 and 124 are urged together, the next step is to twist and fold the combined structure 120 in the manner illustrated in FIGS. 3A-3C.

To deploy the structure 120 back to the expanded, fully deployed position, the frame members 122 and 124 are unfolded. The resiliency and spring force of the frame members 122, 124 will cause the frame members 122, 124 to spring open to the expanded configuration. The frame members 122, 124 can then be pivoted about their hinged overlapping points 126, 128 to deploy the structure 120 to its original expanded configuration. When the frame members 122, 124 are fully deployed, the wall 152 can assume the configuration shown in FIG. 6.

FIG. 7 illustrates yet another structure 200 according to the present invention. The structure 200 has a rim member 202 and a containing member 204. The rim member 202 defines a central opening 218, and includes a collapsible frame member 206 that can be the same as the frame member 40 described above.

Referring to FIG. 8A, the rim member 202 can be embodied with the frame member 206 retained inside a frame retaining sleeve 208. The sleeve 208 and frame member 206 can extend around the entire rim member 202. The sleeve 208 can have the same construction as the sleeve 38 described above, and the frame member 206 can be retained inside the sleeve 208 in the manner described above.

Referring now to FIG. 8B, the rim member 202 can be the same as in FIG. 8A, except that one or more inflatable members 210 (e.g., an inflatable tube) can also be provided inside the sleeve 208 and extend around the entire rim member 202. An air inlet 212 can extend through the sleeve 208 to allow air to be introduced into the inflatable member 210.

In addition, a protective covering (which can be the same as protective covering 42) can be provided to cover the frame member 206. The protective covering can be effective in preventing the metallic frame member 206 from rust and damage due to possible exposure to water.

The containing member 204 can be embodied in the form of a flexible and waterproof sheet of material, such as PVC, plastic, polyethylene or other similar kinds of material. The material should be capable of being folded and crumpled when not in use. The sheet of material of the containing member 204 is attached (e.g., by stitching) to the rim member 202 to define an internal containing space. The material of the containing member 204 is sized and configured so that the containing member 204 has a base 216 that has a wider diameter than the diameter of the rim member 202 when the containing member 204 is stretched taut to its maximum limit (e.g., when the containing member 204 is filled with water), as shown in FIG. 7.

To use the structure 200 as a collapsible pool, the user merely places the structure 200 on the ground and introduces water through the central opening 218 of the rim member 202 into the containing space of the containing member 204. As the containing member 204 fills up with water, the rim member 202 rises up, and the base 216 of the containing member 204 begins to expand and assume a diameter that is wider than the diameter of the rim member 202. The flexible and waterproof nature of the material used for the containing member 204, as well as the sagging experienced by the annular side wall of the containing member 204, allow the containing member 204 to retain water (without spilling) while simultaneously conforming to the increasing volume of the water.

The embodiment of FIG. 8B provides one or more inflatable members 210 that can float on top of the water level of the water that is being introduced into the containing member 204, which further helps to maintain the water inside the containing member 204 without experiencing spillage thereof. The inflatable member 210 can be embodied as one continuous inflatable member 210 extending around the sleeve 208, or as a plurality of inflatable members 210 spaced apart inside the

sleeve 208.

When the user wishes to store the structure 200, the user merely empties the water from the containing member 204, squeezes, folds or crumples the material of the containing member 204 against the rim member 202, and then twists and folds the frame member 206 in the same manner as shown in FIGS. 3A-3C to reduce the size of the structure 200.

FIGS. 9-10 illustrate yet another structure 300 according to the present invention. The structure 300 is essentially the same as the structure 200 in FIG. 7, except that additional frame members are provided to improve the support and stability for the containing member 304. The structure 300 also has a rim member 302 and a containing member 304 that can have the same construction as the rim member 202 and the containing member 304, respectively. The rim member 302 also defines a central opening 318, and includes a collapsible frame member 306 (that can be the same as the frame member 40 described above) that is housed inside a sleeve 308 (that can be the same as the sleeve 208 described above). The containing member 304 also defines a base portion 309.

One or more additional frame members 305, 310 and 315 can be provided along the side wall of the containing member 304. Each frame member 305, 310 and 315 can be housed inside respective sleeves 325, 330 and 335 that extend around the circumference of the containing member 304. Each sleeve 325, 330 and 335 can be attached (e.g., by stitching or heat sealing) in spaced apart manner to the desired height along the containing member 304. Each sleeve 325, 330, 335 can have the same construction as the sleeve 208 described above.

In addition, a protective covering (which can be the same as protective covering 42) can be provided to cover the frame members 306, 305, 310 and 315. The protective covering can be effective in preventing the metallic frame members from rust and damage due to possible exposure to water.

The additional frame members 305, 310, 315 provide additional support to the containing member 304 to allow the containing member 304 to remain upright when filled with water. For example, the containing member 204 in FIG. 7 does not need any additional supporting frame members if the size of the structure 200 is not too large. If the structure 200 increases in size, the rim member 202 and the containing member 204 alone may not be sufficient to keep the containing member 204 upright when filled with water. The present inventor has found that providing additional

frame members (e.g., 305, 310 and/or 315) will provide sufficient support to keep the containing member 304 upright when filled with water.

Although three additional frame members 305, 310 and 315 are shown in FIGS. 9-10, any number of additional frame members (e.g., one, two, three or more) can be provided depending on the size of the structure 300 and the degree of support that is needed. In addition, although one of the frame members 315 is shown as being positioned along the base portion 309, this is also not necessary as the frame members can be positioned at any vertical level along the side wall of the containing wall 304.

To use the structure 300 as a collapsible pool, the user merely places the structure 300 on the ground and introduces water through the central opening 318 of the rim member 302 into the containing space of the containing member 304. As the containing member 304 fills up with water, the rim member 302 rises up. The additional frame members 305, 310, 315 provide support to the containing member 304.

When the user wishes to store the structure 300, the user merely empties the water from the containing member 304, and then squeezes, folds or crumples the material of the containing member 304 against the rim member 302. The frame members 305, 310, 315 can be compressed against the rim member 304, and then the user can twist and fold the combined frame members 306, 305, 310, 315 in the same manner as shown in FIGS. 3A-3C to reduce the size of the structure 300.

While the description above refers to particular embodiments of the present invention, it will be understood that many modifications may be made without departing from the spirit thereof. The accompanying claims are intended to cover such modifications as would fall within the true scope and spirit of the present invention.